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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,967	07/10/2001	Hideki Masubuchi	Q65000	4248

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EXAMINER	
FISCHER, JUSTIN R	
ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 10/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/869,967	MASUBUCHI ET AL.	
	Examiner	Art Unit	
	Justin R Fischer	1733	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 8-20* is/are rejected.

7)☒ Claim(s) *6,7 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The indicated allowability of claims 5-7 and 20 is withdrawn in view of the newly discovered reference(s) to Bruyneel (US 5,431,850) and Amamiya (JP 5-338753). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-4 and 8-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the following language appears in 7: "all of the filaments constituting an outer most sheath layer...". It is unclear if this language is attempting to describe all of the filaments in the outermost sheath layer of both the core and sheath strands or if this language is attempting to describe all of the filaments in the outermost sheath layer in the sheath strands. For examination purposes, the claim is being viewed as requiring all of the filaments in the outermost sheath layer of each sheath strand to have the claimed limitation since this description occurs in the paragraph that initially defines the sheath strands as being formed of one or more sheath layers. Applicant is asked to clarify the language of the claimed invention without the introduction of new matter.

With respect to claims 2-4, the following language appears in claim 2, line 5: "all of the filaments constituting each sheath layer". In an analogous manner to claim 1 above, it is unclear if this language is defining the sheath layers in only the sheath strands, only the core strands, or both the core and sheath strands. For examination purposes, the claim is being viewed as requiring all of the filaments in the sheath layers of the core strand to have the claimed limitation since this description occurs in the paragraph that initially defines the core strand as having one or two sheath layers. Applicant is asked to clarify the language of the claimed invention without the introduction of new matter.

Regarding claim 8, applicant defines a distance between steel filaments in each layer of "the strand". It is suggested that applicant amend the claim to recite "a distance between mutual steel filaments in each layer of each strand" to clearly suggest that all of the relevant strands (core and sheath) contain the claimed characteristic if such an embodiment is intended.

With respect to claim 9, the language "all of the filaments constituting an outermost sheath layer have the same diameter". As previously stated, it is unclear if applicant intends this language to require the outermost sheath layer in only the sheath strands to have the claimed limitations or if applicant intends this language to require the outermost sheath layers all of the strands (core and sheath) to have the claimed limitation.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 5, 9, 15, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Bruyneel (US 5,4161,850, newly cited). As best depicted in Figure 7, Bruyneel teaches a steel cord construction having the following characteristics: a core strand 20 formed by twisting a plurality of filaments and a plurality of sheath strands 14 arranged around said core strand and each formed by twisting a plurality of filaments, wherein (a) each of the sheath strands is formed by twisting one or more sheath layers made of plural filaments around a core made of one or more filaments (in this case three- reference character 22) and (b) all of the filaments 36 constituting an outermost sheath layer have the same diameter which is larger than the diameter of the filaments 22 constituting at least a layer located inside the outermost sheath layer.

With respect to claim 5, as previously stated, each of the sheath strands contains two sheath layers and further comprises a core formed of three filaments.

Regarding claim 9, each of the examples in Bruyneel satisfy the claimed relationship as set forth below:

Example 1- φ_S=0.57 mm, Φ=3.05 mm (0.69 + 2(0.61) + 2(0.57)), and φ_C=0.69, wherein $\Phi/(6.14 \times \varphi_S) = 0.87$.

Example 2- φ_S=0.20 mm, Φ=1.06 mm (0.24 + 2(0.21) + 2(0.20)), and φ_C=0.24, wherein $\Phi/(6.14 \times \varphi_S) = 0.86$.

With respect to claim 15, as previously stated, the filaments in the outermost sheath layer in Example 2 have a diameter of 0.20 mm. It is further noted that this construction is only exemplary and Bruyneel is directed to a wide variety of constructions in which the filaments can have a diameter that varies between 0.15 and 1.20 mm (Column 3, Lines 45-50).

Regarding claim 17, Figure 7 of Bruyneel depicts a steel cord having six sheath strands 14 twisted around a single core strand 12, wherein each of the sheath strands is formed of two sheath layers made of plural filaments around a core made of three filaments.

6. Claims 1, 5, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Amamiya (JP 5-338753, newly cited). As best depicted in Figures 2 and 3, Amamiya teaches a steel cord construction having the following characteristics: a core strand 3A formed by twisting a plurality of filaments and a plurality of sheath strands 3B arranged around said core strand and each formed by twisting a plurality of filaments, wherein (a) each of the sheath strands is formed by twisting one or more sheath layers made of plural filaments around a core made of one or more filaments (in this case three - 3a) and (b) all of the filaments 3d constituting an outermost sheath layer have the same diameter which is larger than the diameter of the filaments 3a constituting at least a layer located inside the outermost sheath layer.

Regarding claim 5, the core strand of Amamiya is formed of three central filaments and a plurality of sheath strands formed by twisting two sheath layers about said central filaments. In this instance, the filaments in each of the sheath layers in the

core strand have a diameter greater than a filament constituting a layer located inside of the respective sheath layer.

Regarding claim 17, the steel cord of Figure 2 includes a core strand and six sheath strands, wherein each of said sheath strands has a construction formed by arranging two sheath layers around a core made of three filaments.

With respect to claim 18, Amamiya describes the twisting direction of the filaments in the outermost sheath layer as being the same as that of the sheath strand (Paragraph 13, as provided by USPTO translator).

Claim Rejections - 35 USC § 102 / 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 20 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bruyneel. Bruyneel discloses a mutli-strand steel cord having a plurality of sheath strands twisted around a core strand, wherein each of the sheath and core strands are formed of a plurality of filaments and the filaments in the outermost sheath layer have a diameter that is greater than the filaments in at least one layer (core layer) located inside of the outermost sheath layer. The reference further states that such a multi-strand steel cord can be used for the reinforcement of heavy-duty tires (Column 1, Lines 10-15). Although Bruyneel fails to expressly describe the multi-strand cord as being used in a carcass and/or a belt, these

components represent the fundamental structure of tires and one of ordinary skill in the art at the time of the invention would have recognized the language of Bruyneel (reinforcement of heavy-duty tires) to suggest the use of the multi-strand steel cord in the carcass and/or belt. In any event, steel cords represent an extremely well known reinforcing material that is extensively used in a variety of tire components due to its high strength characteristics, including the carcass and the belt. As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the multi-strand cord of Bruyneel in the carcass and/or belt.

Claim Rejections - 35 USC § 103

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Bruyneel or Amamiya as applied in Paragraphs 5 and 6 above respectively and further in view of Kuromizu (EP 0342492, of record) and Sumitomo (JP 07238480, of record). In describing the steel cord construction, Bruyneel and Amamiya, which are directed to reinforcement of conveyor belts and tires, is completely silent with respect to the tensile strength of the steel filaments. In any event, one of ordinary skill in the art at the time of the invention would have recognized the range of the claimed invention as defining well known and extensively used steel filaments, it being further emphasized that the claimed range is broad and incorporates a plurality of conventional steel filaments, as evidenced by Kuromizu and Sumitomo. Kuromizu (Page 2, Lines 7-16 and Page 6, Lines 9-11) suggests that conventional steel wires for use in conveyor belts have a tensile strength of at least 2,840 MPA (290 kgf/mm2), while the preferred embodiment contains a tensile strength between approximately 3,230 MPa and 3,922 MPa (330 – 400 kgf/mm2). In a similar manner, Sumitomo suggests a steel cord

reinforcement element for conveyor belts in which the individual steel filaments have a tensile strength of at least 2,940 MPa (300 kgf/mm2), which is nearly identical to that required by the claimed invention. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to form the steel cord of Bruyneel from filaments having a tensile strength of at least 3,000 MPa as such a filament is widely used in the reinforcements of elastomeric articles, such as conveyor belts, as shown for example by Kuromizu and Sumitomo.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Bruyneel or Amamiya as applied in Paragraphs 5 and 6 above respectively and further in view of Abe (US 4,762,466, of record). In describing the steel cord construction, Bruyneel and Amamiya fail to expressly suggest using a wrapping filament. In any event, it is well known and conventional to include wrapping filaments with layered steel cord constructions in order to hold the individual strands together and prevent the filament/wires of each strand from separating, as shown for example by Abe (Figure 1). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a wrapping filament in the steel cord construction of Bruyneel and Amamiya, for the benefits detailed above, there being no conclusive showing of unexpected results to establish a criticality for the use of a wrapping filament in the specific cord construction detailed by the claimed invention.

Allowable Subject Matter

11. Claims 3, 4, 6-8, 10-14, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including (i)

all of the limitations of the base claim and any intervening claims and (ii) claim language that addresses the 112, 2nd Paragraph rejections noted above, where applicable.

Regarding claims 3, 4, 6, and 7, the prior art references of record (e.g. Bruyneel) do teach a steel cord construction having a core strand and a plurality of sheath strands, wherein (i) said sheath strands contain a core formed of three filaments and one or two sheath layers and (ii) the filaments in each sheath layer have a diameter larger than that of a filament in a layer located inside of the respective sheath layer. However, the references fail to expressly suggest the claimed quantitative relationship regarding the area of the filaments in the core strand and the area defined by the circumference of the filaments (area of core strand) and one of ordinary skill in the art at the time of the invention would not have found it obvious to incorporate the claimed relationship. It is noted that while some of the prior art references of record describe the diameters of core filaments and sheath filaments, none of the steel cord constructions having features (i) and (ii) also contain a core strand in which the actual filament diameter is greater than 0.715 or 0.730 times the diameter of the core strand as defined by the outermost sheath layer. With such a steel cord construction, the respective filaments in the core strand are closely spaced and cord breakage is better controlled.

With respect to claims 8 and 21, the prior art references of record failed to suggest a spacing of not more than 0.014 mm between filaments in each of the layers in combination with features (i) and (ii) noted above. It is particularly noted that Bruyneel suggests a first free space and second free space between filaments in a first and second sheath layer of a core strand- these spaces are described as being between 0.010 mm and 0.075 mm and between 0.030 mm and 0.150 mm. Thus, Bruyneel

teaches away from having a spacing of not more than 0.014 mm between steel filaments in each of the layers (both in the core strand and the sheath strand).

Regarding claims 10-14, the claims require a base steel cord construction in which a plurality of sheath strands are wrapped around a core strand, wherein said sheath strands are formed of two sheath layers wrapped around a core formed of three filaments and all of the filaments constituting an outermost sheath layer have the same diameter. Bruyneel and Amamiya disclose this base steel cord construction. However, claims 10-14 further require that all the filaments in a given steel cord construction have the same diameter except for the filaments in a single layer. For example, claim 10 requires that every filament in the steel cord have the same diameter except for the filaments in the outermost sheath layer. The prior art references of record fail to suggest, disclose, or teach a steel cord construction (having the base construction noted above) in which filaments in a first layer are formed of a first diameter and every additional filament is formed of an equal, second diameter. As is more commonly formed, the steel cord construction of the prior art references of record have respective layers formed of the same diameter filament; however, the filament diameters vary between respective layers in the core and sheath strands.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Watanabe (JP 11-21775), Yamashita (JP 6-173179), Matsumoto (JP 8-109585) and Watanabe (JP 8-170283) are directed to a plurality of mutli-strand, steel cord constructions in which (a) the core of the core strands and sheath strands is formed of one or more filaments, (b) all of the filaments in the outermost sheath layer

are formed of the same diameter filament, and (c) the sheath strands are formed of a single sheath layer around said core.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(703) 605-4397**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (703) 308-3853. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JEFF H. AFTERGUT
PRIMARY EXAMINER
GROUP 1300

Justin Fischer

October 2, 2003